

## Original Article

# Reviewing the Content and Design of Anaphylaxis Management Plans Published in English

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**What is already known about this topic?** Anaphylaxis management plans (AMPs) are recommended for all patients in international guidelines, and there are a number of plans published globally. Past research has recommended components to be included in AMPs.

**What does this article add to our knowledge?** Forty-one plans were identified and had their design and content catalogued. No plans contained all previously recommended components. Other key instructions to patients were missing from plans regarding autoinjector usage and patient positioning.

**How does this study impact current management guidelines?** Clinicians must be selective in choosing the optimal AMP for their patients. Clinicians should be aware that currently available AMPs do not include all recommended components. Future plans should consider including patient positioning guidance.

**BACKGROUND:** Guidelines recommend that patients at risk of anaphylaxis are given an anaphylaxis management plan (AMP) providing advice on symptom recognition and emergency management. However, the format and content of plans is not standardized.

**OBJECTIVE:** The objective of this study was to review the design and contents of different AMPs available in English. **METHODS:** A systematic internet search identified AMPs published online. Each plan was analyzed for design and content (including signs and symptoms indicative of anaphylaxis and the actions to be taken). The content was compared with an e-Delphi-derived statement of the key characteristics of an AMP. **RESULTS:** The systematic search identified 41 plans from 29 different sources. The majority of plans identified were personalized management plans for individuals (78%); the others were designed for institutions. Most AMPs addressed both mild/moderate and severe allergic reactions and had different instructions related to the degree of severity. Thirty-seven individual symptoms were mentioned as indicators of anaphylaxis. Only 55% of plans that recommended the administration of an adrenaline autoinjector gave further instructions

on how to do this. Only 17% of plans contained comprehensive instructions on safe patient positioning.

**CONCLUSIONS:** There are a wide variety of AMPs in English available online. Plans are similar in design, but differ in content. None of the currently available plans contain all the desirable components recommended in the literature. Because of the variation between plans, when practitioners select an AMP for their patient, they need to be attentive to the content of the plan and its appropriateness for that individual. © 2017 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2017;■:■-■)

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International (eg, World Allergy Organization [WAO]), regional (European Academy of Allergy and Clinical Immunology), and national guidelines (Royal College of Paediatrics and Child Health) recommend that patients at risk of anaphylaxis are provided with adrenaline autoinjectors (AAIs) together with written instructions describing how, and when, to administer them. Although there are many anaphylaxis management plans (AMPs) available, they are not universally employed. A survey published in 2008 reported that 64% of 1885 patients who had suffered probable anaphylaxis in the community did not possess a written AMP.<sup>1</sup>

Although there is no grade A evidence for the use of AMPs, their use is supported by 2 case series demonstrating a reduced number of severe allergic episodes in patients provided with a written AMP as part of a wider training and education program.<sup>2,3</sup> In addition, the possession of a written AMP has been shown to be associated with better adherence to self-care behaviors in adolescents.<sup>4</sup> The ideal content of an AMP was developed in 2010 in the United Kingdom using an e-Delphi approach<sup>5</sup> where 26 experts in allergy were contacted for their opinions by e-mail. All responses were collated and then returned to the expert panel in an anonymous format. The next stage

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**Abbreviations used**

AAI- Adrenaline autoinjector  
 AMP- Anaphylaxis management plan  
 CV- Cardiovascular  
 GI- Gastrointestinal  
 WAO- World Allergy Organization

involved voting on their agreement with each of the opinions proposed in the first round. This study reported 12 recommended components to be included in AMPs; these were agreed by  $\geq 80\%$  of the panel of experts. The aim of this research was to identify and review the design and contents of different AMPs available in English.

**METHODS**

To identify AMPs, a systematic search of the internet was carried out between November 2015 and January 2016. The search strategy is summarized in [Table E1](#) (available in this article's Online Repository at [www.jaci-inpractice.org](http://www.jaci-inpractice.org)). Each term was searched for individually. The first 100 results from each of the 5 search terms used, sorted by the search engine's measurement of relevance, were screened for inclusion. The initial screening identified whether the title of the web matched inclusion and exclusion criteria. Results continued to be screened beyond 100 until 10 consecutive page titles were excluded as not being relevant.

Our search focused on countries where a large proportion of the population spoke English as their first language and there was a health care system that includes specialist allergy services: Australia, Canada, New Zealand, Republic of Ireland, South Africa, United Kingdom, and United States of America.

The most frequently visited search engine for each country was used, based on Alexa web traffic ranking. This uses a sample of millions of internet browsers to estimate popularity. In all 7 cases, the dominant search engine was the regional variant of Google.

Identified websites were examined thoroughly. Where websites had an internal search facility, this was used with the terms "anaphylaxis" and "plan" to find relevant pages. In addition to locating management plans published on identified websites, each site was searched for links or reference to websites not previously located. In the event that a website required a username and password to access content, wherever possible an account was created and used. If plans were located but not accessible, the website administrator was contacted to request a copy.

A data extraction form was designed to capture all symptoms mentioned, instructions given, and other written components in addition to design elements. The form was piloted on 6 plans and revised before being used to review the remaining plans. Any unexpected characteristics encountered were noted and added to the data extraction form before the AMPs were assessed for a second time. These results were presented descriptively together with an analysis of how many of the 12 e-Delphi study recommended components were included in each AMP.

**RESULTS**

The systematic search identified 284 websites to review; 29 of these websites published AMPs and 7 published multiple versions, resulting in 41 distinct AMPs in total. Eleven plans originated from the United Kingdom, 10 from both Canada and the United States, 4 from both Australia and Ireland, and 1 from

South Africa ([Figure 1](#)). Another plan was identified from a secondary source, a website that publishes management plans in 16 different languages, including English. Information about the origin of each plan and the access details are available in [Table E2](#) (available in this article's Online Repository at [www.jaci-inpractice.org](http://www.jaci-inpractice.org)).

**Origins of management plans**

The majority of plans (24 of 41, 59%) were published by charities or nongovernmental organizations. Six plans (15%) were published by primary or secondary health care providers and 6 (15%) were published by education authorities or schools. The remaining 5 plans (12%) were published by care providers/community organizations, pharmaceutical companies, public or regional health bodies, or private individuals.

Thirty-two plans (78%) were designed for an individual. The others were to be applied to any person suffering anaphylaxis within an institution (eg, in a school setting, the AMP could be used for any pupil). Sixteen plans (39%) were specifically designed to be used in schools. The 32 plans (78%) for individuals contained space to record a range of variables about the patient. The prevalence of these is shown in [Table I](#).

Twenty-four plans (59%) included a year of publication. Nine (22%) were published in 2014-2015, 8 (20%) between 2012 and 2013, 5 (12%) between 2010 and 2011, and the remaining 2 (5%) in 2009. Only 7 plans (17%) included any indication of version number.

**Design**

The plans were all A4 or letter sized; 24 (59%) were single side, whereas 15 (37%) were 2 sides in length. Two plans were longer, covering 4 and 5 sides, respectively.

The plans commonly featured logos and visuals demonstrating autoinjection, but only 2 plans (5%) used other graphics. Nineteen plans (46%) were published in full color versus grayscale. The mean word count was 453 words (range: 183-1664), with plans designed for individuals containing fewer words than plans designed for institutions ( $P = .048$ ). The mean word count per page was 327 words (range: 199-1664) with plans designed for institutions having more words per page ( $P = .013$ ).

**Information recorded about the plan and the patient**

**Advice on preventing anaphylaxis.** Seventeen plans (41%) contained information aimed at reducing the risk of anaphylaxis or instructions on what to carry in anticipation of a reaction. These instructions are shown in [Table II](#). Four plans, all of which were designed for institutions, contained more detailed instructions for the day-to-day management of at-risk individuals as well as emergency management plans.

**Symptoms discussed.** Across all plans, a total of 37 distinct symptoms or signs relating to anaphylaxis were mentioned. These could be categorized by systems: central nervous system, cardiovascular (CV), gastrointestinal (GI), respiratory system, dermatological, and other.

The most frequently mentioned symptom category across all plans was respiratory, followed by GI or dermatological.

Frequently plans made some distinction between signs or symptoms that were indicative of a mild/moderate and those that were severe, and recommended different actions accordingly (26, 63%). Two plans (5%) advised that multiple mild symptoms from more than one body system should be

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